

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

REC'D 23 FEB 2005

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To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/IB2004/000431

International filing date (day/month/year)
18.02.2004

Priority date (day/month/year)
20.02.2003

International Patent Classification (IPC) or both national classification and IPC
C25C3/18, C25C3/12

Applicant
MOLTECH INVENT S.A.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523856 epmu d
Fax: +49 89 2399 - 4465

Authorized Officer

Hammerstein, G

Telephone No. +49 89 2399-8175



**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2004/000431

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application,
☒ claims Nos. 27, 28

because:

- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☒ no international search report has been established for the whole application or for said claims Nos. 27, 28
- ☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:
- | | |
|----------------------------|--|
| the written form | <input type="checkbox"/> has not been furnished |
| | <input type="checkbox"/> does not comply with the standard |
| the computer readable form | <input type="checkbox"/> has not been furnished |
| | <input type="checkbox"/> does not comply with the standard |
- ☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.
- ☐ See separate sheet for further details

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
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Box No. IV Lack of unity of Invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:
- ☐ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☒ not paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- ☐ complied with
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
 - ☒ the parts relating to claims Nos. 1-26

**Box No. V Reasoned statement under Rule 43b/s.1(a)(i) with regard to novelty, inventive step or
Industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-26
	No: Claims	
Inventive step (IS)	Yes: Claims	1-26
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-26
	No: Claims	

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No. .
PCT/B2004/000431

Box No. VI Certain documents cited

1. Certain published documents (Rules 43*bis*.1 and 70.10)
and /or
2. Non-written disclosures (Rules 43*bis*.1 and 70.9)
see form 210

Re Item IV.

The separate inventions/groups of inventions are:

First invention, claims 1-26:

Claims 1-26 are directed towards a cell and method for electrowinning aluminium, comprising

- a metal-based anode having an outer part that contains at least one of Ni, Co and Fe and an electrochemically active oxide-based surface,
- a fluoride-containing molten electrolyte being at a temperature of below 950 °C and having a particular composition.

Second invention, claim 27:

Claim 27 is directed towards an aluminium electrowinning anode made from an alloy consisting of

- 65 to 95 wt.% Fe,
- 2 to 10 wt.% Al,
- Ni and/or Co and/or Cu,
- Nb and/or Hf and/or further constituents, the total amount being restricted to 0.25 to 3 wt%.

Third invention, claim 28:

Claim 28 is directed towards an aluminium electrowinning anode made from an alloy consisting of

- 50 to 65 wt.% Ni and/or Co,
- 25 to 40 wt% Fe,
- 3 to 9 wt% Cu,
- 1 to 3 wt.% Al,
- Nb and/or Hf and/or further constituents, the total amount being restricted to 0.25 to 5 wt.%.

They are not so linked as to form a single general inventive concept (Rule 13.1 PCT) for the following reasons:

The common concept linking together the inventions present in the application is an aluminium electrowinning anode comprising at least one of Ni, Co or Fe. This concept is known in the art, see e.g. EIX98154075458 (Compendex Abstract, cited in the search report) which discloses an anode comprising Ni and Fe and having an oxide-based surface, being substantially insoluble in a cryolite bath. It can therefore not provide unity as required by Rule 13.1 PCT.

The first invention defines a cell provided with an electrolyte of a particular composition comprising a defined high amount of dissolved alumina. The problem solved is to provide an electrolyte that inhibits passivation and corrosion of metal-based anodes containing Ni, Co or Fe (page 5, lines 1-29).

The second invention defines an anode mainly comprising iron. It solves the problem of providing another type of those metal-based anodes which remain substantially insoluble at low cell operating temperature and don't passivate (page 3, lines 21-26).

The third invention defines an anode mainly comprising nickel and/or cobalt. It solves the problem of providing another type of those metal-based anodes which remain substantially insoluble at low cell operating temperature and don't passivate.

First invention, claims 1-26:

Re Item V.

Cited documents:

- D1: DATABASE COMPENDEX [Online] ENGINEERING INFORMATION, INC., NEW YORK, NY, US; SEKHAR J A ET AL: "Micropyretically synthesized porous non-consumable anodes in the Ni-Al-Cu-Fe-X system". XP002307620 Database accession no. EIX98154075458
- D2: US-A-5 006 209 (BECK THEODORE R ET AL) 9 April 1991 (1991-04-09)
- D3: US-B-6 379 5121 (JURIC DRAGO D ET AL) 30 April 2002 (2002-04-30)
- D4: US-A-5 725 744 (DE NORA VITTORIO ET AL) 10 March 1998 (1998-03-10)
- D5: B. PIRIOU ET AL.: "Essais de caractérisation structurale des bains cryolithiques par spectrométrie infrarouge et par hypertrempe" REVUE INTERNATIONALE DES HAUTES TEMPERATURES ET DES

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/IB2004/000431

REFRACTAIRES, vol. 15, no. 2, 1978, pages 139-146, XP009040625
FRANCE.

Novelty and inventivity, Article 33(1) PCT:

Aluminium electrowinning cells comprising an anode having an outer part containing nickel, cobalt or iron and an oxide-based surface and an electrolyte containing aluminium-fluoride, sodium fluoride and potassium fluoride and dissolved alumina are known in the art, see each of D1 to D3.

However, the subject-matter of the claims is distinguished over this prior art by the composition of the electrolyte and thus the operating temperature of the cell. In particular, the high amount of dissolved alumina is not disclosed in this prior art.

D4 and D5 disclose a high amount of dissolved alumina, however the overall composition of the electrolyte and hence the cell operating temperature is different. Thus, none of the further pre-published documents hints to the combination of the features of claim 1, which in a cell comprising cermet anodes solves the problem of high efficiency by providing a particularly high amount of dissolved alumina.

The subject-matter of claims 1-26 is therefore considered new and inventive. The requirements of Article 33(1) PCT are met.

Re Item VI.

- The document

WO 2004/035871 A (DE NORA VITTORIO ; NGUYEN THINH T (CH); DURUZ
JEAN-JACQUES (CH); MOLTE) 29 April 2004 (2004-04-29)

published on 29.04.2004 with the filing date 17.10.2003 and claiming the priority
of 18.10.2002 discloses the same subject-matter as the present application.